

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: LIPP, Eberhard

SERIAL NO.: 09/858,137

ART UNIT: 1723

FILED: May 15, 2001

EXAMINER: COOLEY, C.E.

TITLE: VERTICAL MIXER

REMARKS ON AMENDMENT "A"

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office communication of December 26, 2002, a response being due with a one month extension of time by April 26, 2003, please consider the following remarks in conjunction with the amendments to the above-identified application as follows:

REMARKS

Upon entry of the present amendments, original Claims 1 - 16 have been canceled and new Claims 17 - 26 substituted therefor. Reconsideration of the rejections, in light of the foregoing amendments and present remarks, is respectfully requested. The present amendments have been entered for the purpose of placing the claim language into a more proper U.S. format and also for the purpose of more clearly distinguishing the present invention from the prior art patents.

In the Official Action, it was indicated that Claims 1 - 4 and 6 - 7 were rejected under 35 U.S.C. § 102(b) as anticipated by the Marshall patent. Claims 1 - 7 and 16 were also rejected 35 U.S.C. § 102(b) as being anticipated by the Ott patent. Claims 16 was also rejected 35 U.S.C. § 112,

second paragraph, as being indefinite. There were also minor informalities noted in the specification and drawings.

As an overview to the present reply, Applicant has extensively amended the original independent claim language in the form new independent Claim 17 along with dependent Claims 18 - 22. New Claims 17 - 22 express the original limitations in a more proper U.S. format, including proper antecedent bases and proper structural interrelationships throughout. In particular, independent Claim 17 incorporates the limitation of previous independent Claim 1, along with the limitations of dependent Claim 2. As such, independent Claim 17 is particularly directed to "a first spiral-shaped mixing blade" and a "second spiral-shaped mixing blade" that are spaced from each other by a transition zone. This transition zone has "no spiral-shaped mixing blades extending from the axle" in this area. Additionally, independent Claim 17 utilizes proper "means-plus-function" language to indicate that there is a "mixing spiral means" for "conveying product upwardly in said housing". Independent Claim 17 also positively recites the housing. The axle is identified as extending vertically within the housing. Dependent Claims 18 - 22 correspond respectively to original dependent Claims 3 - 7.

With respect to the prior art Marshall patent, it is important to note that there is no "transition zone" which extends in an axial direction that is free of mixing spirals. Although the Examiner indicates that the "interruption 26" is free of a mixing spiral, there is actually a baffle means 28 formed within this interruption 26. As a result, the transition zone is not free of mixing spirals since this baffle means can also be considered a "mixing device". Additionally, the interruption 26, at least in the axial direction, is bridged with the protrusion 32 that can be found at the baffle means 28. These protrusions, due to their inclination, form parts of a "mixing spiral" that stands still. Once again, the

interruption 26 is not "free of a mixing spiral" and thus the Marshall patent does not directly read on independent Claim 17.

Applicant notes the Examiner's arguments that "the mixing spiral have different axial conveyed quantities by virtue of different helix angles". Applicant respectfully contends that there is no basis for this assumption within the Marshall patent.

With respect to the Ott patent, it is important to note that the first mixing spiral 4 and the second mixing spiral 16 are not arranged one after the other in an axial direction. Accordingly, the transition zone, which is free of mixing spirals, is not arranged in this axial direction either. The mixing spirals and the transition zone of the Ott patent are arranged parallel to each other in a radial direction.

To further distinguish the present invention from the prior art, Applicant has inserted independent Claim 23 herein. Independent Claim 23 incorporates the limitations of previous independent Claim 1, along with the limitations of original Claim 12. Dependent Claims 24 and 25 correspond to previous dependent Claims 14 and 15. Applicant has inserted new independent Claim 26 herein. Independent Claim 26 corresponds to the limitations of original independent Claim 1, along with the limitations of dependent Claim 16. Applicant respectfully contends that neither the Marshall patent nor the Ott patent anticipates the language of the present invention, as defined by independent Claims 23 and 26.

Applicant has extensively amended the specification so as to replace the term "mixed good" with the term "mixed product". Additional other informalities found in the original specification have been corrected herein.

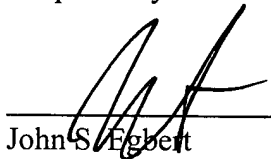
Applicant has amended the Title in accordance with the Examiner's suggestions. Additionally, the drawings have been appropriately amended so as to conform with the Examiner's suggestions.

Based upon the foregoing analysis, Applicant contends that independent Claims 17, 23 and 26 are now in proper condition for allowance. Additionally, those claims which are dependent upon these independent claims should also be in condition for allowance. Reconsideration of the rejections and allowance of the present claims at an early date is earnestly solicited. Since no new claims have been added above those originally paid for, no additional fee is required.

Respectfully submitted,

Date

4.22.03



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VERSION WITH MARKINGS TO SHOW CHANGES MADE in AMENDMENT "A"

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office communication of March 15, 2001, a response being due by April 15, 2001, please amend the above-identified application as follows:

IN THE SPECIFICATION

On page 1, line 1 of the substitute specification, delete the previous Title "VERTICAL MIXER" and add in new Title as follows:

--MIXING AND REDUCING MACHINE WITH AN UPWARD CONVEYING MIXING
BLADE--

On page 9 and 10 of the substitute specification, please revise the paragraph as follows:

In Figure 4, it is furthermore recognized that the shaft 8 is set in bearings so that it overhangs above the cover 2, so that the mixing station shaft ends at a greater distance above the container bottom 3. On this lower end of the shaft 8, a shearing head 27 is arranged, which rotates together with the shaft 8. In the process, it is in mesh with a counter-shearing head 28, which is driven through its own drive shaft 29 in the opposite direction, whereby the drive shaft 29 is guided separately through the container bottom 3. Through the shearing head 27 and the counter-shearing head 28, the mixed [good] product that is dropping as described above is additionally mixed again along the shaft 8 via the rotating speed differences, rotating directions, gap widths and diameters of

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the shearing heads that are predominant here. In this area, the liquid can also be supplied very well, and it is mixed in an especially effective manner.

On page 1 and 3 and 4 of the substitute specification, please revise the paragraph as follows:

In order to increase the effectiveness of mixing with the spirals, it has proven to be especially favorable if at least one of the spirals provided is interrupted in the circumferential direction and is comprised of mixing blades that are connected after each other in the circumferential direction. Through this type of interruption of the mixing spiral, the mixed [good] product is mixed in an especially intensive manner, since it is moved in especially small volumes by the blades, and comes to rest again. Moreover, each mixing blade can be equipped with a different conveying angle both in the axial and in the radial direction, whereby an additionally improved mixing effect can be obtained.

On page 4, first paragraph of the substitute specification, revise the paragraph as follows:

A further improvement of the intermixing is achieved when at least individual mixing blades have, on their ends that are trailing in the rotating direction, a lifting edge that is bent upwards, through which a brief impulse directed upwards is imparted to a mixed good portion lifted by the mixing blades, before this mixed [good] product portion begins to drop again due to the force of gravity, whereby it is then picked up again by a trailing mixing blade and further intermixed accordingly.

On page 4, second paragraph of the substitute specification, revise the paragraph as follows:

In a special embodiment form of this type of mixing spiral comprised of mixing blades, two mixing blades at a time are arranged essentially above each other and are connected to each other by an essentially vertically running blade carrier that is set in the rotational direction. With this blade carrier, on which if necessary, even more than two blades arranged above each other can be mounted, the mixed [good] product can be accelerated or slowed down in the radial direction.

On page 6, first paragraph of the substitute specification, revise the paragraph as follows:

FIGURE 5 is a cross-sectional view of a mixing and reducing machine [according to FIGURE 4] across lines 5-5 of FIGURE 4.

On page 6, fifth paragraph of the substitute specification revise the paragraph as follows:

Furthermore, in the example depicted here, an additional supply lance 6 is depicted, by which liquid that is yet to be mixed in during the mixing operation can be possibly added to the mixed [good] product that is filled through the supply opening 4.

On page 6, seventh paragraph of the substitute specification revise the paragraph as follows:

On this shaft 8, two mixing spirals that convey upwards are mounted above each other. With them, the mixed [good] product is revolved in the vertical mixer as indicated by the dot-dash lines 10: on the circumferential area of the housing 1, the mixed [good] product is conveyed upwards through the two mixing spirals and drops down again in the vicinity of the shaft 8, in particular, also because of the force of gravity.

On pages 6 and 7 of the substitute specification, revise the paragraph as follows:

The mixing spirals are, as can be recognized in the view in Figure 2, not continuous, but instead they are interrupted in the circumferential direction and are comprised of several mixing blades 11 to 13 that are connected one after the other in the circumferential direction. Figure 3 shows schematically how the individual mixing blades are arranged. In Figure 2, a zero-line is marked for this purpose, starting from which an angle α is measured. The first mixing blade 11.1 is arranged at an angle of $\alpha = 0^\circ$, after which the mixing blade 12.1 is arranged at an angle of $\alpha = 120^\circ$, which is in turn followed by the mixing blade 13.1 at an angle of $\alpha = 240^\circ$. A small portion of the mixed [good] product is grasped by the first mixing blade and correspondingly conveyed axially and radially and again released. Each subsequent mixing blade picks up parts of this conveyed portion and conveys and mixes it further.

On page 7, second paragraph of the substitute specification, revise the paragraph as follows:

Each of these mixing blades has on its end that is trailing in the rotational direction, a lifting edge 18 that is angled upwards. Through it, a portion of the mixed [good] product, which was lifted by the mixing blade, is given a slight impulse upwards, before it drops again slightly because of the force of gravity, and is picked up by the following mixing blade and conducted again further upwards.

On pages 7 and 8 of the substitute specification, revise the paragraph as follows:

It is now essential to the invention that the mixing blade 13.2 shown is not directly followed by another mixing blade (in the example shown here, 14.1), but instead that here a transition zone 19 extends in the axial direction, which is free of a mixing spiral in the example shown here. – In other words, in this area, the mixed [good] product that was conveyed until now is again brought to rest, before it is picked up by the following other mixing blades 14.1, 15.1 and 16.1 and/or then 14.2, 15.2 and 16.2, which are positioned at circumferential angles of $\alpha = 60^\circ$, 180° , or 300° .

On page 8 of the substitute specification, revise the paragraph as follows:

It should also be pointed out here that the blade carriers 17 mentioned are set opposite the rotation direction, in order to support a mixed [good] product transport in the radial direction, which favorably affects the mixing. In the example depicted here, these blade carriers 17 are mounted in the process via carrier arms 20 onto the shaft 8, which has on the side lying in front in the rotating direction (according to the arrow 21 in Figure 2), a front surface 22 that is increasingly chamfered

radially to the outside. Also, in this way, a transport of the mixed [good] product radially to the outside is supported.

On page 8, third paragraph of the substitute specification, revise the paragraph as follows:

Furthermore, it is to be pointed out, that the lowest mixing blade 11.1 is provided with a stripper 23 that strips over the bottom 3 of the housing 1 and lifts up the mixed [good] product that is settling there.

On page 8, last paragraph of the substitute specification, revise the paragraph as follows:

All in all, with the mixing device described, the mixed good can be conducted axially and radially in smaller partial portions, whereby a subsequent mixing blade always picks up and conveys further parts of the mixed [good] product portion that is conveyed from the mixing blade that has previously passed. This stirring of very small [mixed good] portions of the mixed product achieves a fast and intensive intermixing.

On page 9, second paragraph of the substitute specification, revise the paragraph as follows:

For mixing jobs in which the shearing of the mixed [good] product, which can be achieved through the mixing elements described thus far, is no longer sufficient to obtain a homogeneous end product, additional shearing elements are shown in the Figures 4 and 5, with which a corresponding vertical mixer according to the invention can be additionally equipped.

On page 9, third paragraph of the substitute specification, revise the paragraph as follows:

In the process, catchment elements 24 are mounted on the wall of the cylinder-shaped housing 1 of the mixing container. The blades 25 that assist this catchment element 24 and that are also conducted close along the cylindrical container wall like the aforementioned mixing blades, form an additional shearing gap [26] with the catchment element 24 on their radially outside end, which reinforces the mixing effect for the vertical mixer. In the process, one or more blades 25 can be driven in mesh over several rings 24 arranged axially above each other. Of course, instead of rings that go completely around the circumference, only segments of them can be mounted. As can be recognized in Figure 5 in the lower half, the catchment elements can also be constructed as toothed rings 26, which especially further increases the shearing action.

On page 10, first paragraph of the substitute specification, revise the paragraph as follows:

On the whole, the present invention shows an effective device for ensuring a mixed [good] product preparation operating in the vertical direction, in which the maximum homogeneity requirements can be met while simultaneously keeping the batch times short. The different shearing effects over the zones of the mixer are especially advantageous in the process when liquids are added as mixing components, since in the area of the liquid additions, the increased shearing effect leads to

a quick distribution of these components. Since this increased shearing effect only occurs locally, however, the drive output is, on the whole, not increased unnecessarily and the wear is also lowered. Also, fragile solid portions are not destroyed and are not exposed to any non-permitted high temperature increases.

IN THE CLAIMS

Claims 1 - 16 canceled. Claims 17 - 26 were newly added claims. There is no marked-up copy of these claims.

IN THE ABSTRACT

On page 14, first paragraph of the substitute specification, revise the Abstract as follows:

A mixing and reducing machine with an upward-conveying mixing spiral that rotates around a vertical rotational axle. In order to achieve a more intensive mixing of the mixed [good] product [it is proposed to connect] a second mixing spiral is connected in the axial direction after a first mixing spiral, with a transition zone arranged in between. In this way, zones of different axial conveying capacity are connected after each other in the axial direction. [In a preferred embodiment form,] The mixing spirals are formed of several mixing blades arranged after each other in the circumferential direction.

IN THE DRAWINGS

In Figures 1 and 4, please see the attached drawing sheets, indicating amendments in red ink.